

**CONSTRUCTION SPECIFICATIONS (HDPE RISER):**

**GENERAL**  
All materials are to be supplied by the Contractor unless otherwise specified in the plans. All materials must be handled and stored in a careful and workmanlike manner. Unless otherwise noted, all pipes and fittings must be attached according to manufacturers' recommendations. All materials shall be carefully inspected before they are installed.

**MATERIALS ("DUAL-WALL " HDPE PIPE)**

Unless otherwise specified, the High Density Polyethylene Pipe (HDPE) shall have a smooth interior and annular exterior corrugations. Manning's "n" value for the pipe shall not exceed 0.012. The HDPE riser and stub assembly shall be manufactured by a continuous 1/2" factory extrusion weld.

For pipe sizes 12-inches and larger, the pipe shall meet the requirements of AASHTO M294 Type S. Pipe and fitting material shall be high-density polyethylene meeting the requirements of ASTM D3350 Cell Classification 325420C. Where joints are necessary, pipes shall be joined with a bell-and-spigot joint meeting the requirements of AASHTO M252 or M294. The bell shall be an integral part of the pipe and provide a minimum pull-apart strength of 400 lbs. The bell-and-spigot joint shall incorporate a rubber gasket meeting the requirements of ASTM F477 and shall be watertight meeting ASTM D3212. Gaskets shall be installed on the pipe or as recommended by the pipe manufacturer. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

**MATERIALS (CORRUGATED METAL PIPE)**

All corrugated steel pipe (CMP) shall be metallic zinc-coated unless otherwise specified. The pipe shall conform to the requirements of ASTM A-760, A-762, A-885, for the specified type, class, and fabrication of pipe and coating.

**MATERIALS (TRASH RACK)**

Unless otherwise specified, trash racks shall be of the "beehive type" with bar spacings at the base of the trash rack no smaller than 2.0" and with a bar diameter of no less than 1/4". Trash racks to be constructed of steel and finished in accordance with the manufacturers specifications.

**MATERIALS (ANTI-SEEP DIAPHRAGM)**

When required, the anti-seep diaphragm shall be manufactured from high density polyethylene (HDPE), unless otherwise stated. It shall be a two piece collar that conforms to the pipe material specified. The HDPE material shall be no less than 1/4 inch in thickness. The two portions of the anti-seep diaphragm shall overlap 1.5 inches prior to being bolted together. 3/8 inch holes shall be spaced 6 inches on center to allow for bolting of two portions together. 1/4 inch stainless steel bolts and hardware shall be supplied and used to connect the sheets together. Stainless steel bands shall also be supplied and used to clamp the collar to the pipe. Unless otherwise specified by the manufacturer, the inside yoke of the collar shall be coated with Trumbull 5X mastic sealer or other acceptable polymer caulking material prior to securing the pipe. All other installation requirements/instructions shall be in accordance with the recommendation of the manufacturer. The anti-seep diaphragm shall be located as staked or determined in the field by the Project Technician. Approved manufacturer: Schiebl Drainage Products #660-446-2343 or equivalent.

**HANDLING THE PIPE**

The Contractor shall furnish all equipment necessary to transport and place the pipe without damaging it.

When handling and placing corrugated polyethylene pipe, care shall be taken to prevent impact blows, abrasion damage, and gouging or cutting (by equipment or other site materials). All special handling requirements of the manufacturer shall be strictly observed. Special care shall be taken to avoid impact when the pipe must be handled at temperatures of 40° F or less.

**INSTALLATION AND ASSEMBLY OF PIPE**

The trench or excavation for the placement of the pipe shall be constructed to the elevations and grades as shown or as staked. Trench shields, shoring and bracing, or other methods necessary to safeguard the workers and the work, and to prevent damage to existing improvements, shall be furnished, placed, and subsequently removed by the Contractor.

Unless otherwise specified, no filter or envelope is required. The bottom of the trench shall be shaped to form a semicircular groove in its center. The pipe shall be firmly and uniformly bedded throughout its entire length to the elevation and grade. The minimum trench width at the top of the pipe should be adequate to permit installation and provide bedding conditions suitable to support the load on the pipe. Unless otherwise specified, the pipe shall be assembled and installed in accordance with ASTM D2321. The pipe shall be laid to the elevations and grades shown on the drawings or as staked.

Unless otherwise noted, excavation for and subsequent installation of pipe sections shall begin at the outlet end and progress upstream. All field cut pipe ends shall have all burrs removed prior to assembling joints. The ends of the pipe and fittings shall be free of foreign material when assembled. Unless otherwise noted, the pipe shall be installed with the bell end upstream.

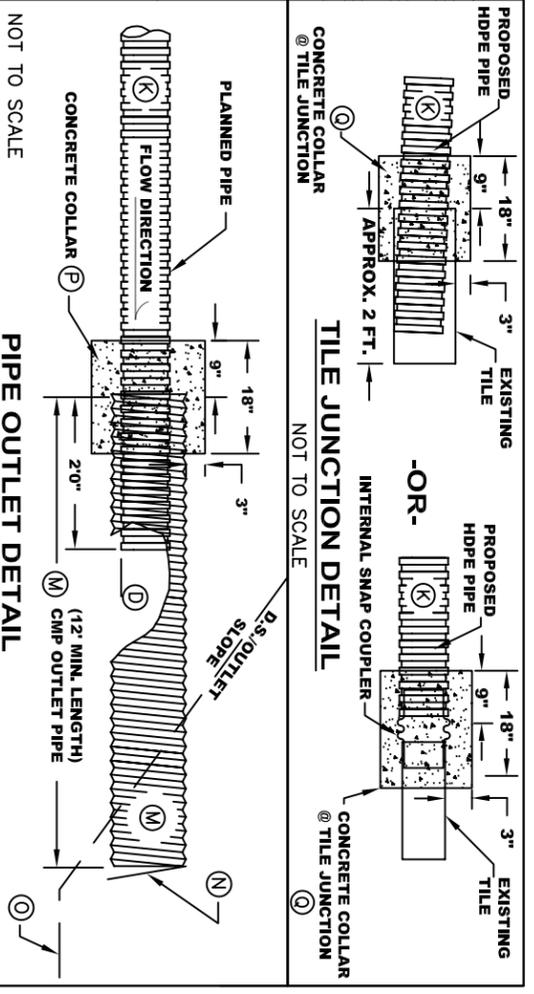
**BACK FILLING**

Compaction of the initial backfill shall be by hand tamping or manually directed power tampers adjacent to and to a depth of 2 feet over the pipe to provide adequate lateral support to the pipe. The backfill around any anti-seep diaphragms shall be done in a comparable manner. The initial backfill material shall be selected friable soil free from rocks or stones larger than 1 inch in diameter and earth clods greater than 2 inches in diameter. At the time of placement, the moisture content of the material shall be such that a firm compacted fill can be achieved. During the initial backfill, the thickness of layers before compaction shall not exceed 4 inches. The moisture content of the backfill material shall be maintained within the limits required to: a) allow the soil to form a ball that does not readily separate when kneaded in the hand; b) prevent adherence of the fill material to the equipment treads or tracks; c) prevent rutting by equipment; and; d) ensure that blending of the soil results in a reasonably homogeneous mass. Initial backfill shall be compacted to a density equal to that of the surrounding undisturbed soil. Special care shall be taken to obtain compaction under the lower half of the pipe. The pipe shall be loaded sufficiently during backfilling around the sides to prevent it from being lifted from the bedding or sub grade and to maintain full contact with the bedding during placement operations.

The final backfill material shall be free of large rocks, frozen soil, and other debris larger than 4 inches in diameter. The material shall be placed and spread in approximately uniform layers in such a manner that there will be no unutilized spaces in the backfill and the backfill will be level with the natural ground or the design grade. Rolling equipment shall not be used to compact the final backfill until at least a 2-foot depth of cover has been placed over the pipe. During the final backfill, the thickness of layers before compaction shall not exceed 9 inches.

The use of compaction equipment or methods that produce horizontal or vertical earth pressures which may cause excessive displacements or which may damage the installed pipe will not be permitted. All special backfilling requirements of the pipe manufacturer shall be met.

**OTHER:**



**DESIGN DATA**

STRUCTURE/WETLAND BASIN # \_\_\_\_\_ POOL AREA = \_\_\_\_\_ ACRES  
 DRAINAGE AREA = \_\_\_\_\_ ACRES  
 DRAINAGE AREA TO POOL AREA RATIO = \_\_\_\_\_ DESIGN ZONE: \_\_\_\_\_  
 TOP OF RISER ELEV. = \_\_\_\_\_ FT.  
 INV. ELEV. OF RISER = \_\_\_\_\_ FT. OR  TO BE FIELD DETERMINED.  
 GRADE OF PIPE = \_\_\_\_\_ % OR  TO BE FIELD DETERMINED.  
 INV. ELEV. AT PIPE OUTLET/TILE JUNCTION = \_\_\_\_\_ FT. OR  TO BE FIELD DETERMINED.  
 OUTLET TYPE (Select One)  TILE JUNCT.  PIPE OUTLET  
 FENCE TRASH SKIMMER  IS REQUIRED  IS NOT REQUIRED  
 ANTI-SEEP DIAPHRAGM  IS REQUIRED  IS NOT REQUIRED  
 DISTANCE FROM RISER TO ANTI-SEEP DIAPHRAGM = \_\_\_\_\_ FT.  
 WIDTH OF BERM = \_\_\_\_\_ FT.  
 RIPRAP:  IS NOT REQUIRED  REQUIRED AT INLET  REQUIRED AT OUTLET

**BILL OF MATERIALS**

SIZE	UNIT	ITEM DESCRIPTION	UNIT	QTY.
		<input type="checkbox"/> FENCE SKIMMER (if required) See Sheet # _____ for details)	EACH	
X	FT. x FT. (H) x (W)	<input type="checkbox"/> HDPE ANTI-SEEP DIAPHRAGM (if required)	EACH	
	CLASS	<input type="checkbox"/> ROCK RIPRAP (if required) See Sheet # _____ for details)	C.Y.	
		<input type="checkbox"/> GEOTEXTILE MATERIAL (if req'd.) See Sheet # _____ for details)	S.Y.	
	DIA. INCHES	<input type="checkbox"/> HDPE RISER STRUCTURE (See Sheet # _____ for details)	EACH	
	DIA. INCHES	<input type="checkbox"/> HDPE PIPE LENGTH	LN. FT.	
	DIA. INCHES	<input type="checkbox"/> TRASH RACK	EACH	
	DIA. INCHES	<input type="checkbox"/> CMP OUTLET PIPE (16 ga. Annular or Helical)	LN. FT.	
		<input type="checkbox"/> HINGED TYPE RODENT GUARD FOR CMP OUTLET PIPE	EACH	
		<input type="checkbox"/> EXCAVATE AREA FOR PIPE OUTLET (As directed)	EACH	
		<input type="checkbox"/> GROUDED JUNCTION AT PIPE OUTLET	EACH	
		<input type="checkbox"/> GROUDED TILE JUNCTION (May Require Coupler)	EACH	

Project Name: \_\_\_\_\_

**HDPE RISER W/CONCRETE FOOTING** Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_ Title: \_\_\_\_\_

\_\_\_\_\_ Esessment OR Project No. \_\_\_\_\_ Plan Sheet \_\_\_\_\_ of \_\_\_\_\_ DWG# MN-ENG-210

Prepared by Minnesota Board of Water & Soil Resources-Rev 09/17/02